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Evaluation in Early Childhood Education

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Completed June 11, 1997

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Abstract:

Pre-service early childhood teachers used mind mapping to organize science concepts and document the children's level of constructed understanding. The process made the evaluation of children's understanding and curriculum planning and evaluation easy to document while imposing clarity and reinforcing and focusing the overall learning construction. Related children's literature was the medium for introducing the science concept. The mind mapping activity was evaluated by a survey questionnaire. Pre-service teachers indicated that they would use mind mapping techniques for planning, recording, reorganizing, and evaluating new understandings gained in math and science due to the imposed clarity of thought, the visual orientation, and the simplicity of the technique.

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Introduction

Science is not only one of the most important areas in education, it begins with early childhood programs. (Rutherford and Ahlgren, 1990). Children explore their environment, the living things in their environment, and the phenomenon about which they can observe and draw conclusions. These experiences will result in misconceptions, personal knowledge that will form the basis for conventional knowledge when they reach formal operations. Although children are too immature to learn theory, they increase awareness and inquire about life, development, and change. In the child's play and misconception, the ability to think and solve problems develops through processes like observation, inference, classification, and conclusion. The products of science, knowledge from the physical and biological world, develop through thinking about their environment.

For Dewey (1910) thinking and problem solving were much the same. He explored thinking in his studies of early education. Sequentially, a person would (1) recognize that a problem exists, (2) gather data, (3) formulate hypotheses, (4) test hypotheses, (5) collect additional data, sometimes proving that the first hypotheses is wrong, (6) summarize to draw conclusions, and finally (7) formulate new generalizations and applying what has been learned.

Children's literature is an ideal and natural way to introduce science in an early childhood program. Books like The Very Hungry Caterpillar (Putnam) and The Winter Duckling (Keith Polette) can be combined with constructive hands-on learning activities to help children develop all the skills that science and the other curriculum areas instill. Through cognitive activities, children see how what they are learning can be applied to other areas of thinking. They can socialize, work in teams, and learn new vocabulary to communicate their knowledge. They will learn much about their world.

Mind mapping, a technique that most closely records the phenomenon of thought as it happens, is a method of tracking the misconceptions that make up a young child's thought, logic, and reasoning. The process of mind mapping combines the processes of right and left brain thinking and promotes creativity, memory, focus, and organization of thoughts. Mind mapping helps organize thoughts in a way that is compatible with how the brain works, while letting thoughts flow so that a teacher can see how much a child knows on any subject. It is like a map of the mind, or a road

map which gives an overview of a large area. A mind map can help a teacher plan, make choices, gather data, think, solve problems, and help track a young child's developing thought. (North & Buzan, 1994)

Method

With the above background, 63 pre-service early childhood teachers participated in a literacy approach to teaching science using mind mapping techniques. The pre-service teachers chose a developmentally appropriate story from children's literature that related to a science concept. The master mind map for science was developed by the class after studying the concepts and units in the area of science for early childhood. Each story was performed for 44 University of Texas at El Paso early childhood students from the Child Care Center.

Stories were developed with the use of props, music, costumes, and constructive learning activities. It was from the constructive learning activities that the misconception-to-learning took place. It was with the mind maps that the pre-service teachers learned to record, analyze, evaluate, and plan the learning of young children.

The future teachers gained a visual picture of how children learn from their "first thoughts" or misconceptions to a correction or "fine tuning" going from problem to solution repeatedly until they were happy with the best understanding that they could perceive at this time in their lives and at the appropriate developmental level.

An example of misconception problem solving was observed by a pre-service teacher who taught about birds using The Winter Duckling. Using the master mind map she selected the science concepts to emphasize when she told the story of a duckling who decides he is strong enough to withstand the harsh winter like the crow, owl, and eagle. The teacher chose to focus on weather, and homes for birds.

The children chose to focus on sweaters for the duckling. Going with the flow of their problem solving, the teacher designed an activity for giving the duckling a sweater. Some of the children thought that the sweater was cute and that it would keep the duckling warm.

Before long, other children reasoned that the duckling could not swim in the sweater. Further, a child retorted that the duckling could not swim at all because "it was snowing and the pond was frozen." The mind map, included at the end of this article, shows the dendrite connections of the various ideas that emerged as the children thought about the situation. This record illustrates the development of scientific thought that occurred in only one story. Recording this experience led to the development of a blank form, in addition to the master mind map, to record

further misconceptions that lead to learning. Many pre-service teachers said that they would include the forms in portfolio assessments of children that would be in their future classrooms.

Although the master mind map and related material served as a curriculum guide, the children's own thoughts directed the specific discoveries and misconceptions that constructed their learning.

Evaluation

A questionnaire was distributed to evaluate the lesson and the methods and techniques that were tried in an effort to better record children's learning, curriculum planning, and evaluation. The results are summarized in the table.

FIGURE 4

Item	Percentage of Respondents
WILL USE MIND MAPPING IN PLANNING	90%
WILL USE MIND MAPPING IN EVALUATION	85%
WILL INCLUDE MIND MAPPING IN PORTFOLIO ASSESSMENT	80%
WILL SHARE MIND MAPPING WITH PARENTS	55%
WILL USE MIND MAPPING IN ORGANIZATION IN SCIENCE AND OTHER AREAS OF TEACHING	90%
WILL USE CHILDREN'S LITERATURE TO INTRODUCE SCIENCE CONCEPTS TO YOUNG CHILDREN	95%

Summary

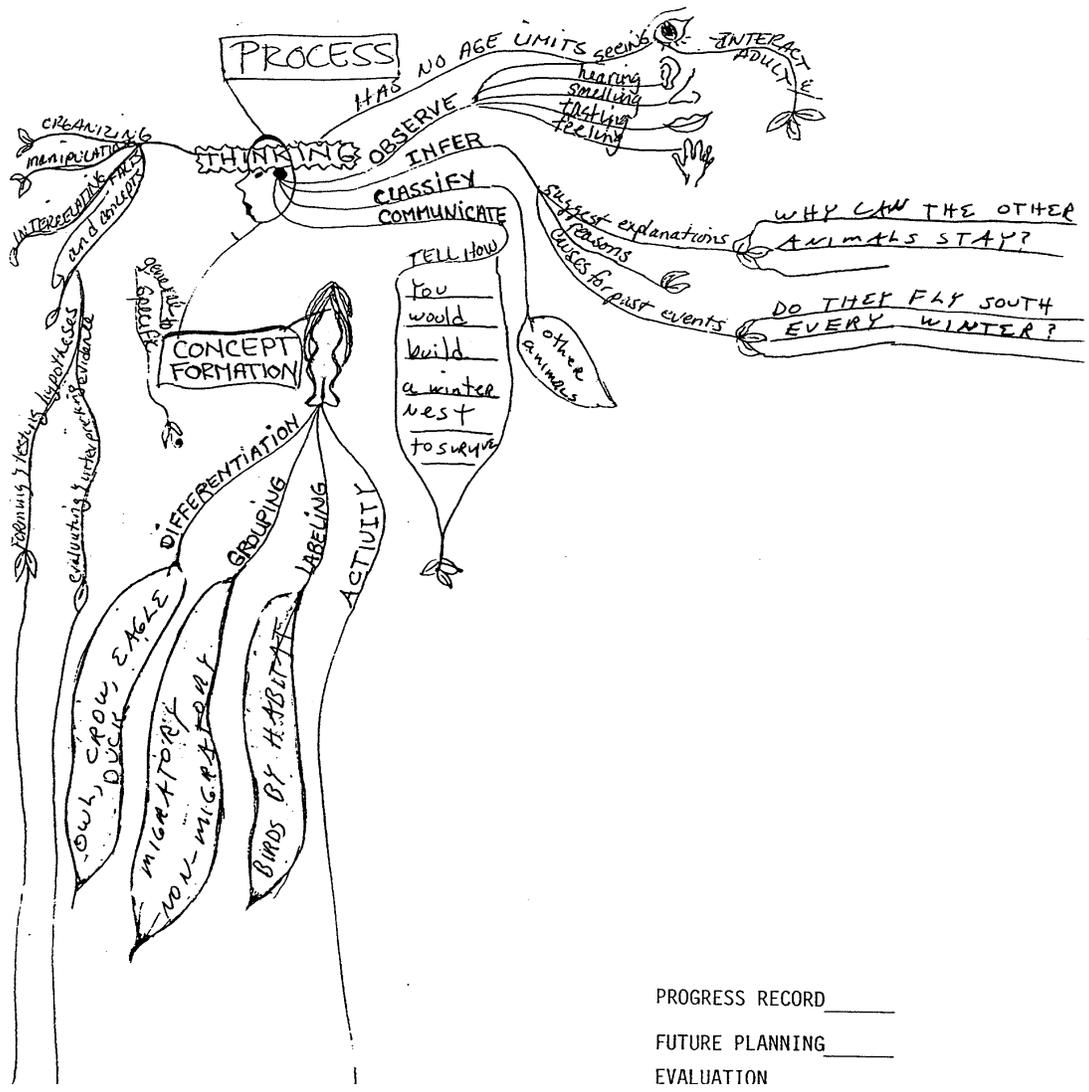
In summary, using children's literature to introduce and lead to science curriculum is a successful and popular idea among pre-service teachers. Further, the mind mapping technique for recording, planning, organizing, and evaluating thinking and learning is a valuable tool for teaching. Pre-service teachers claimed that they were most impressed with the imposed clarity of thought, the visual orientation, and the simplicity of the technique.

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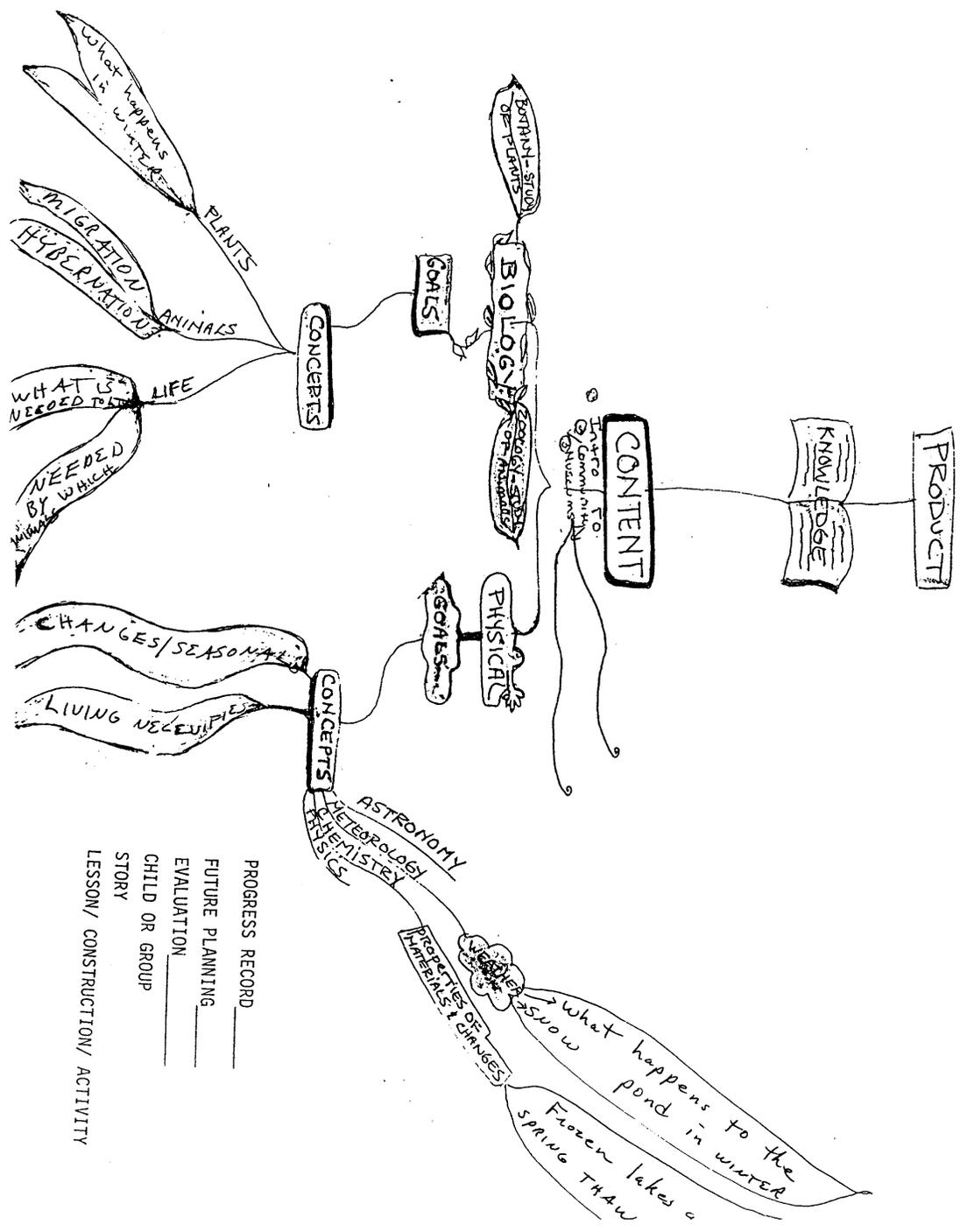
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Examples: Three Mind-maps from the story The Winter Duckling

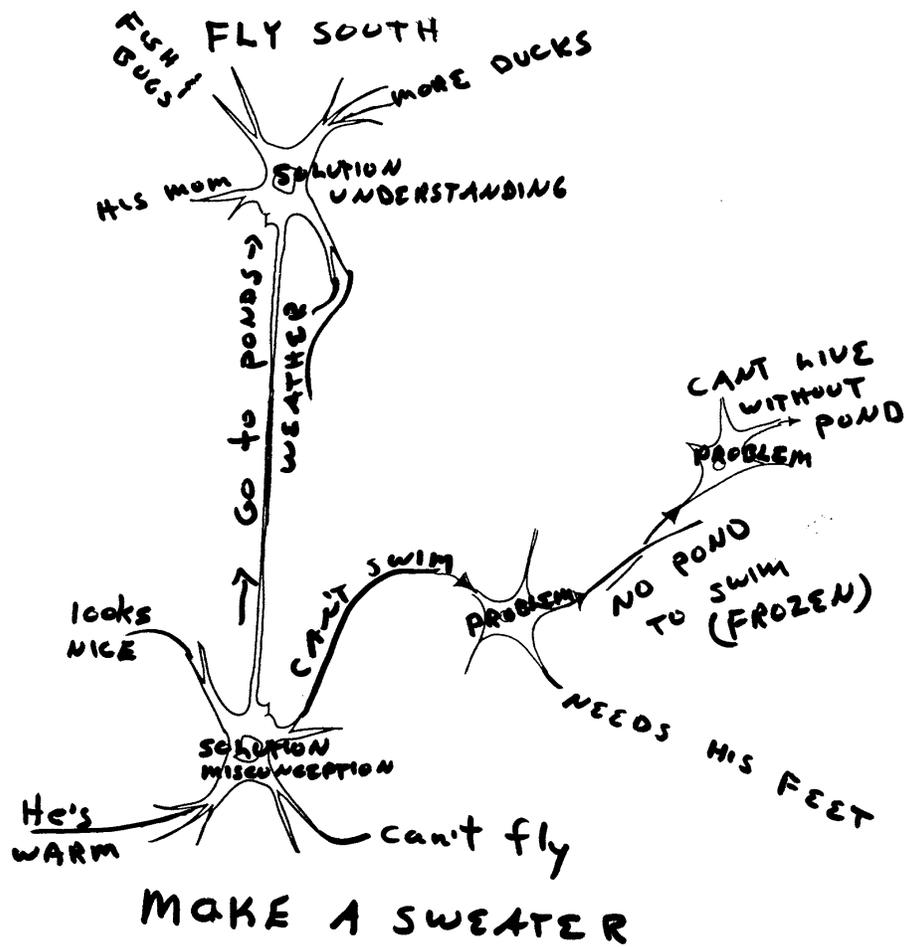
CHILD OR GROUP
 STORY
 LESSON/ CONSTRUCTION/ ACTIVITY



PROGRESS RECORD _____
 FUTURE PLANNING _____
 EVALUATION _____



- PROGRESS RECORD _____
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PROBLEM
 ↓
 SOLUTION
 ↓
 MISCONCEPTION
 ↓
 UNDERSTANDING

THE WINTER DUCKLING